

PATENT ABSTRACTS OF JAPAN

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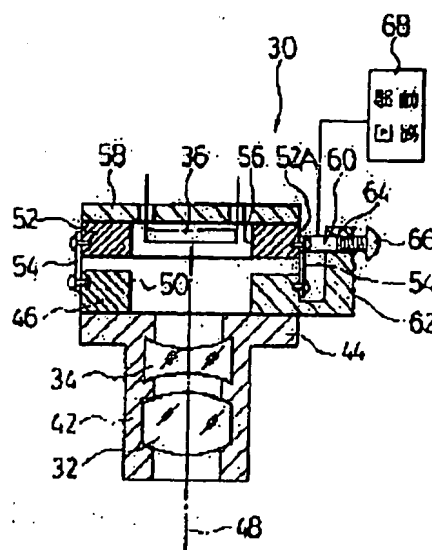
(54) PHOTOGRAPHING DEVICE

(57)Abstract:

PURPOSE: To provide a photographing device which can remove dust adhered to an image pickup part constituted by a CCD and the like with simple structure.

CONSTITUTION: The lens barrel 42 of an image pickup unit 30 is fixed to a film image input device main body. A fixing stand 46 is fixed on the flange 44 of the lens barrel 42. A pedestal 52 to which a CCD line sensor 36 is fitted is supported to the fixing stand 46 through flat springs 54, 54..., and it can be vibrated against the fixing stand 46 by the elastic force of the flat springs 54, 54... A piezo element 60 is provided for the arm 62 of the fixing stand 46, and the end part of the piezo element 60 is made abutted on the peripheral part 52A of the pedestal 52.

When a drive circuit 68 is driven and voltage is impressed on the piezo element 60, the pedestal 52 is hammered by the piezo element 60 by the stress deformation of the piezo element 60 and it vibrates. Thus, the CCD line sensor 36 is vibrated through the pedestal 52, and dust adhered to the CCD line sensor 36 is removed by the vibration.



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CLAIMS

[Claim(s)]

[Claim 1] Photography equipment carried out [removing the dust which adhered to the image pick-up section by establishing an oscillating grant means to vibrate this image pick-up section, and vibrating the image pick-up section with this oscillating grant means, and] as the description in photography equipment equipped with the image pick-up section which photos a photographic subject through a taking lens while supporting said image pick-up section on the body of photography equipment through an elastic body.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to photography equipments, such as a camera with which photography equipment was started, especially solid state image sensors, such as CCD, were used as the image pick-up section, a camcorder/movie, and a film picture input device.

[0002]

[Description of the Prior Art] The image pick-up section has some which were indicated by JP,62-147963,A as what is attached to the body of photography equipment, and prevents the dust adhesion after attachment so that dust may not adhere to the light-receiving side or low pass filter of CCD. this dust antisticking structure -- covering -- the front face of the light-receiving side of CCD -- receiving -- an attitude -- it prepares movable and covering is closed at the time of un-using it. However, with the photography equipment of JP,62-147963,A, once dust adheres to the light-receiving side of CCD, there is a fault that the dust is unremovable.

[0003] Then, he is trying to remove the dust adhering to a light-receiving side, and the dust of that near by preparing the duct for vacuums which has arranged suction opening ahead of the light-receiving side of CCD, and attracting the air near the light-receiving side of CCD by this duct for vacuums with the photography equipment indicated by JP,1-113463,A as photography equipment which cancels such fault.

[0004]

[Problem(s) to be Solved by the Invention] However, with the photography equipment of JP,1-113463,A, since the duct for vacuums is arranged, photography equipment must become large-scale and the fan for suction also has to prepare, there is a fault that the whole equipment becomes complicated. This invention was made in view of such a situation, and aims at offering the photography equipment from which the dust adhering to the image pick-up section is removable with simple structure.

[0005]

[Means for Solving the Problem] In order to attain said purpose, while this invention supports said image pick-up section on the body of photography equipment through an elastic body in photography equipment equipped with the image pick-up section which photos a photographic subject through a taking lens, it establishes an oscillating grant means vibrate this image pick-up section, and is carrying out removing the dust adhering to the image pick-up section as the description by vibrating the image pick-up section with this oscillating grant means.

[0006]

[Function] Since according to this invention the image pick-up section is vibrated with an oscillating grant means and the vibration removed said dust from the image pick-up section when dust had adhered to the image pick-up section, the dust adhering to the image pick-up section is removable with simple structure.

[0007]

[Example] It explains in full detail about the desirable example of the photography equipment applied to

this invention according to an accompanying drawing below. Drawing 1 is structural drawing where the photography equipment concerning this invention was applied to the film picture input device. It is equipped with a film cartridge 12 in the body 10 shown with the two-dot chain line in drawing of a film picture input device. In said film cartridge 12, the photographic film [finishing / development] 14 is beforehand wound around spool 16, and after this photographic film 14 is sent out by the film drive mechanism from a film cartridge 12, it is fed with it in the drawing 1 Nakaya mark direction.

[0008] A film drive mechanism engages with the spool 16 of a film cartridge 12, and consists of a film feed zone which rotates normally / reverses the spool 16, the film winding section which rolls round the photographic film 14 which engages with the receiving spool 20 of the film winding room 18, and is sent out from said film feed zone, and the film feed section with which pinch the photographic film 14 sent out from the film feed zone by capstans 22 and 22 and pinch rollers 24 and 24, and it feeds with constant speed.

[0009] He is trying for said film feed zone to send out a photographic film 14 from a film cartridge 12 until it drives the spool 16 of a film cartridge 12 in the direction of the clockwise rotation in drawing and a film edge is rolled round with a receiving spool 20. Furthermore, the clutch device which controls rotation of said spool 16 is prepared in the film feed zone, and it is fed with a photographic film 14 by this clutch device and operation of the driving force of said capstans 22 and 22 with predetermined tension.

[0010] It is installed down [between the capstan 22 to which the image pick-up unit 30 is installed above / between a capstan 22 and 22 /, and the light source 32, on the other hand counters said image pick-up unit 30, and 22]. Said image pick-up unit 30 has taking lenses 32 and 34 and the CCD line sensor 36 as the image pick-up section, as shown in drawing 2 . The CCD line sensor 36 is arranged in the rectangular direction to the feed direction of a photographic film 14, and reads the transparency image of the film 14 under feed illuminated by said light source 32 through taking lenses 32 and 34. After the image processing of the electrical signal changed by the optoelectric transducer of the CCD line sensor 36 is carried out with the image processing system 38 shown in drawing 1 , it is outputted to a monitor TV 40 as a video signal. Thereby, the image of a photographic film 14 is displayed on a monitor TV 40.

[0011] Moreover, as shown in drawing 2 , the taking lenses 32 and 34 of said image pick-up unit 30 are held at a camera cone 42, and the camera cone 42 is being fixed to the film picture-input-device body 10. A flange 44 is formed in the upper part of a camera cone 42, and standing ways 46 fix on a flange 44. The open section 50 centering on an optical axis 48 is formed in standing ways 46, and image formation of the transparency image light of said film is carried out to the light-receiving side of the CCD line sensor 36 through this open section 50.

[0012] A cradle 52 is arranged above said standing ways 46. Cradles 52 are flat springs 54 and 54 while being supported by standing ways 46 through a flat spring 54 and 54 -- -- As opposed to standing ways 46, it can vibrate to the film picture-input-device body 10 according to elastic force. Moreover, like [a cradle 52] said standing ways 46, the open section 56 centering on an optical axis 48 is formed, and said low pass filter 35 is attached in this open section 56. In the top face of a cradle 52, the substrate 58 of the CCD line sensor 36 fixes. Thereby, the CCD line sensor 36 can vibrate to standing ways 46.

[0013] On the other hand, the piezo-electric element 60 is inserted in the pore 64 of the arm 62 projected and formed towards the cradle 52 from the periphery section of said standing ways 46. Said piezo-electric element 60 is positioned in the location where the left end section in drawing 2 R> 2 contacts said pore 64 with the screw ** rare ** screw 66 at periphery section 52A of a cradle 52. Moreover, the drive circuit 62 which impresses an electrical potential difference to a piezo-electric element 60 is connected to the piezo-electric element 60.

[0014] Next, the operation concerning dust removal of the constituted photography equipment is explained like the above. First, before reading of the film image by the image pick-up unit 30, the drive circuit 68 is driven and an electrical potential difference is impressed to a piezo-electric element 60. If said electrical potential difference is impressed to a piezo-electric element 60, hammering of the cradle 52 will be carried out to a piezo-electric element by stress deformation of a piezo-electric element 60,

and it will vibrate. Thereby, the CCD line sensor 36 vibrates through a cradle 52, and the dust which has adhered to the low pass filter 35 and the CCD line sensor 36 by the vibration is removed. Therefore, according to this example, the dust which adhered to the image pick-up section with simple structure is removable.

[0015] And after stopping the drive circuit 68, reading of a film image is started. Thereby, dust is not displayed on a monitor TV 40. Moreover, in this example, the frequency and amplitude of a voltage signal which are impressed to a piezo-electric element 60 are changed from the drive circuit 68 with time, as shown in drawing 3. Thereby, when a specific frequency, the frequency also with the other dust of a class unremovable in the amplitude, and the amplitude are given, it can remove. While changing a frequency in 10Hz - 10kHz, he is trying to also change the amplitude in 5micro-20micro in the case of this example.

[0016] The sign same about a member that drawing 4 is the same as that of the image pick-up unit 30 of the 1st example which the 2nd example of the image pick-up unit 70 applied to the photography equipment concerning this invention was shown, and was shown in drawing 2, or similar is attached, and the explanation is omitted. The image pick-up unit 70 shown in this drawing uses DC motor 72 as an oscillating grant means. Said DC motor 72 is fixed to the tongued section 74 projected and formed in the edge of standing ways 56, and the hammer 78 of a cam configuration is attached in the revolving shaft 76. When said hammer 78 rotates, it is positioned in the location where the lobe 78A collides with the edge of a cradle 52.

[0017] Therefore, according to the 2nd example constituted in this way, if DC motor 72 is driven, when lobe 78A of a hammer 78 carries out hammering of the cradle 52, a cradle 52 will vibrate. Therefore, the dust which has adhered to the CCD line sensor 36 by vibration of a cradle 52 is removed. Although this example explained the example applied to the film picture input device as photography equipment, it is not restricted to this, and as long as it uses solid state image sensors, such as CCD, as the image pick-up section, you may apply to photography equipments, such as a camera and a camcorder/movie.

[0018] Moreover, in this example, although the piezo-electric element 60 and DC motor 72 were used as an oscillating grant means, what is necessary is just equipment which is not restricted to this and can give vibration which can remove dust to the image pick-up section. Furthermore, although this example described the example which makes it vibrate in the one direction by one set of an oscillating grant means, it is not restricted to this, and if two or more sets of oscillating grant means are arranged in predetermined spacing and it is made to vibrate them in the many directions, the removal effectiveness of dust can be raised.

[0019]

[Effect of the Invention] The dust which according to the photography equipment applied to this invention as explained above adhered to the image pick-up section since it was made to vibrate the image pick-up section with an oscillating grant means when the image pick-up section was supported through an elastic body on the body of image pick-up equipment and dust adhered to this image pick-up section is removable with simple structure. It is removable.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] Structural drawing showing the example by which the photography equipment concerning this invention was applied to the film picture input device

[Drawing 2] The expanded sectional view showing the 1st example of the image pick-up unit applied to the photography equipment of drawing 1

[Drawing 3] The electrical-potential-difference signal-description Fig. impressed to the piezo-electric element of the image pick-up unit shown in drawing 2

[Drawing 4] The perspective view showing the 2nd example of an image pick-up unit

[Description of Notations]

10 -- Film picture-input-device body 12 -- Film cartridge

14 -- Photographic film 30 70 -- Image pick-up unit

32 34 -- Taking lens 36 -- CCD line sensor

46 -- Standing ways 52 -- Cradle

54 -- Flat spring 60 -- Piezo-electric element

68 -- Drive circuit 72 -- DC motor

78 -- Hammer

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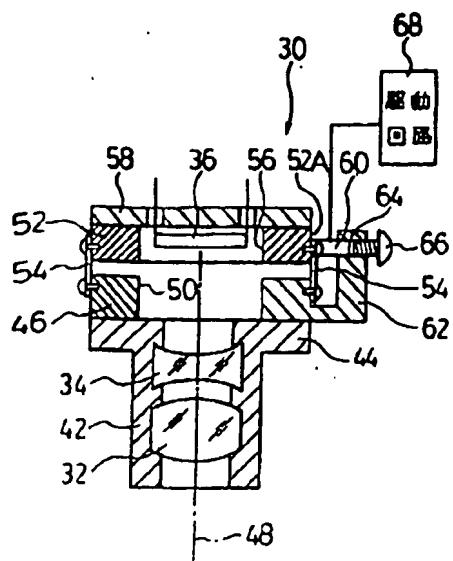
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DRAWINGS

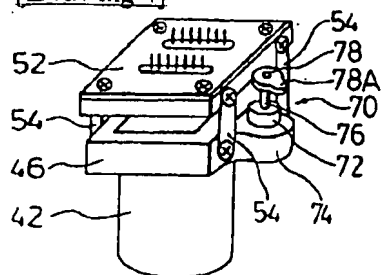
[Drawing 1]



[Drawing 3]



[Drawing 4]



[Translation done.]